CLAIMS

We claim:

1. A scheduler for a plurality of packet storage devices, the scheduler comprising:

a memory device adapted to store a look-up table (LUT) that maps an input address to a LUT output, wherein:

the input address corresponds to current status of one or more of the packet storage devices; and

the LUT output identifies a next packet storage device to select for service and whether the next packet storage device has data available for service;

a latch adapted to store and forward the LUT output; and

an extractor adapted to receive the forwarded LUT output from the latch and to generate (1) a latch enable (LE) control signal that enables the latch to forward the LUT output and (2) a read enable (RE) control signal that identifies which one or more packet storage devices are to be serviced.

2. The invention of claim 1, wherein:

the packet storage devices are FIFOs;

the memory device is a ROM; and

the extractor comprises a finite state machine (FSM) implemented using combinatorial feedback logic.

3. The invention of claim 1, wherein the extractor comprises an FSM having an IDLE state and an EXTRACT state, wherein:

when the FSM is in the IDLE state and a currently selected packet storage device has no data available for service, the extractor sets the LE control signal to enable the latch to forward the LUT output; and

when the FSM is in the EXTRACT state and service of the currently selected packet storage device is completed, the extractor sets the LE control signal to enable the latch to forward the LUT output.

4. The invention of claim 3, wherein:

when the FSM is in the IDLE state and at least one packet storage device has data available for service, the FSM transitions to the EXTRACT state; and

when the FSM is in the EXTRACT state and no packet storage device has data available for service, the FSM transitions to the IDLE state.

5. The invention of claim 1, wherein the current status of the one or more packet storage devices comprises an indication of whether each packet storage device has data available for service and an indication of which packet storage device is currently selected for service.

6. The invention of claim 5, wherein a packet storage device has data available for service when the packet storage device currently stores more than a specified threshold number of data packets.

7. The invention of claim 1, wherein the extractor is further adapted to receive service status information from the packet storage devices.

8. The invention of claim 7, wherein the service status information comprises an indication of completion of service of the currently selected package storage device.

9. The invention of claim 1, wherein the memory device is adapted to be reconfigured to replace an existing LUT with a new LUT in order to change a scheduling algorithm for the packet storage devices.

10. The invention of claim 9, wherein the scheduling algorithm can be changed without having to change any hardware design for the scheduler.

11. A method for scheduling service for a plurality of packet storage devices, the method comprising:

accessing a look-up table (LUT) with an input address to retrieve a LUT output, wherein:

the input address corresponds to current status of one or more of the packet storage devices; and

the LUT output identifies a next packet storage device to select for service and whether the next packet storage device has data available for service;

storing and forwarding the LUT output based on a received latch enable (LE) control signal;

generating the LE control signal based on the forwarded LUT output; and

generating a read enable (RE) control signal that identifies which one or more packet storage devices are to be serviced, based on the forwarded LUT output.

12. The invention of claim 11, wherein:

the packet storage devices are FIFOs;

the LUT is stored in a ROM; and

the LE and RE control signals are generated using a finite state machine (FSM) implemented using combinatorial feedback logic.

13. The invention of claim 11, wherein the LE and RE control signals are generated using an FSM having an IDLE state and an EXTRACT state, wherein:

when the FSM is in the IDLE state and a currently selected packet storage device has no data available for service, the LE control signal is set to forward the LUT output; and

when the FSM is in the EXTRACT state and service of the currently selected packet storage device is completed, the LE control signal is set to forward the LUT output.

14. The invention of claim 13, wherein:

when the FSM is in the IDLE state and at least one packet storage device has data available for service, the FSM transitions to the EXTRACT state; and

when the FSM is in the EXTRACT state and no packet storage device has data available for service, the FSM transitions to the IDLE state.

15. The invention of claim 11, wherein the current status of the one or more packet storage devices comprises an indication of whether each packet storage device has data available for service and an indication of which packet storage device is currently selected for service.

16. The invention of claim 15, wherein a packet storage device has data available for service when the packet storage device currently stores more than a specified threshold number of data packets.

17. The invention of claim 11, wherein the LE and RE control signals are generated based on service status information from the packet storage devices.

18. The invention of claim 17, wherein the service status information comprises an indication of completion of service of the currently selected package storage device.

19. The invention of claim 11, wherein the LUT is stored in a memory device adapted to be reconfigured to replace an existing LUT with a new LUT in order to change a scheduling algorithm for the packet storage devices.

20. The invention of claim 19, wherein the scheduling algorithm can be changed without having to change design of any hardware used to implement the method.

21. A scheduler for a plurality of packet storage devices, wherein the scheduler comprises a look-up table (LUT) that identifies a next packet storage device to select for service based on current status of one or more of the packet storage devices.

22. The invention of claim 21, further comprising:

a latch adapted to store and forward the identification of the next packet storage device to select for service based on a latch enable (LE) control signal; and

a finite state machine (FSM) adapted to (1) forward the identification of the next packet storage device to the plurality of packet storage devices and (2) generate the LE control signal, based on service status information from the packet storage devices.

23. The invention of claim 22, wherein the FSM has an IDLE state and an EXTRACT state, wherein:

when the FSM is in the IDLE state and a currently selected packet storage device has no data available for service, the LE control signal is set to enable the latch to forward a LUT output received from the LUT; and

when the FSM is in the EXTRACT state and service of the currently selected packet storage device is completed, the LE control signal is set to enable the latch to forward the LUT output.

24. The invention of claim 23, wherein:

when the FSM is in the IDLE state and at least one packet storage device has data available for service, the FSM transitions to the EXTRACT state; and

when the FSM is in the EXTRACT state and no packet storage device has data available for service, the FSM transitions to the IDLE state.

25. The invention of claim 23, wherein the service status information comprises an indication of completion of service of a currently selected package storage device.

26. The invention of claim 25, wherein the indication of completion of service is an end-of-packet (EOP) signal indicating that a data packet has been extracted from the currently selected package storage device.

27. The invention of claim 21, wherein the current status of the one or more packet storage devices comprises an indication of whether each packet storage device has data available for service and an indication of which packet storage device is currently selected for service.

28. The invention of claim 27, wherein a packet storage device has data available for service when the packet storage device currently stores more than a specified threshold number of data packets.

29. The invention of claim 21, wherein an existing LUT can be replaced with a new LUT in order to change a scheduling algorithm for the packet storage devices.

30. The invention of claim 29, wherein the scheduling algorithm can be changed without having to change any hardware design for the scheduler.